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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	: 10/681,502	Confirmation No.	:	5907
Applicant(s)	: Karl O. Christe et al.			
Filed	: October 7, 2003			
For	: ENERGETIC IONIC LIQUIDS			
TC/AU	: 1793			
Examiner	: Aileen B. Felton			
Docket No.	: AFB00648			
Customer No.	: 26902			

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

Sir:

I, Karl O. Christe of Calabasas, CA, declare and say:

1. I am a co-inventor in the above-identified patent application, having a filing date of 3-30-06 in the USPTO.
2. I have a Ph.D. in Chemistry from the Technical University of Stutgart in Germany.
3. I have worked in the field of energetic materials for over 47 years, am a presently a Professor and Researcher of Chemistry at USC in Los Angeles, CA and have authored or co-authored over 300 Articles on energetic materials.
4. I am familiar with the contents of USP 6, 001,197 to Wagaman, which is cited against claims 1-5, 17, 18 and 21, of the present application, on the grounds of obviousness.

5. However, Wagaman claims only aqueous solutions and not ionic liquids. The generally accepted definition for an ionic liquid states that it is a material "containing only ions". Thus Wagaman does not deal with ionic liquids and, in fact, the word "ionic liquid" is never mentioned in this patent. Also the use of water as a solvent results in significant vapor pressure and can result in the precipitation of solids or phase separation on evaporation of some of the solvent or on cooling which would defeat a purpose of the present invention.
6. Further, the performance of Wagaman's aqueous solutions as propellants would also be poor because her compounds are highly underoxidized. To say that ethylammonium nitrate is oxidizer balanced, is incorrect. Its composition of $C_2H_8N_2O_3$ allows only for the combustion of 6 of the 8 hydrogens and leaves all the carbon unburned. All the other compounds of Wagaman's claim 11 have an even worse oxidizer balance. In addition, Wagaman's compositions contain 5-50 weight % of nonenergetic water. I would like to see rockets fly with such propellants.
7. In propellant chemistry, high performance can only be achieved with good oxidizer balances. The main problem problem consists of achieving good oxidizer balances without increasing the sensitivity of the propellant. This is a very difficult goal to achieve and has been pursued for many decades without great success. The problem of underoxidation is particularly pronounced for ionic liquids because they are normally composed of large organic fuel type cations and small oxidizer anions, resulting in a severe lack of oxidizer. This is why our concept of achieving oxidizer balance is believed novel and significant.
8. I have also carefully read the computational paper of Boatz, my former colleague at AFRL, on the "Design of Energetic Ionic Liquids" and could not find any statement in it which supports the notion that "the addition of water does not cause the materials to lose their properties".

9. For the reasons given above, it is believed that our energetic material, per claims 1 et seq., operates on the novel principle of using complex anions, which carry an excess of oxygen and therefore enable substantially complete combustion of large cations resulting in high performance.

10. I further declare that the statements made herein, made of my own knowledge, are true and that all statements made on information and belief are believed to be true; and furthermore that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above application or any patent issuing thereon.

October 21, 2009

Karl O. Christe

Karl O. Christe, Declarant